

SEQUENCE LISTING

<110> McCool, Gabriel J.
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Cannon, Francis C.
Valentin, Henry E.
Gruys, Kenneth J.

<120> POLYHYDROXYALKANOATE BIOSYNTHESIS ASSOCIATED PROTEINS
AND CODING REGION IN BACILLUS MEGATERIUM

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<141> 1999-01-07

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<170> PatentIn Ver. 2.1

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Cannon Application

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 tatacgccag taaaagataa cctgcataaa acaccaatct tactcgtata tgcattgatc 240
 aataaacgct atattttggga tttaacacct ggaaacagcc ttgttgaata cttattaaac 300
 cgcggttttg acgtgtattt gcttgactgg ggaactcctg ggcttgaaga cagcaatatg 360
 aagctagatg attatattgt agattatatt ccaaaagcgg cgaaaaaggt gctgcgcact 420
 tctaaatctc ctgatttgtc tgttcttggg tactgcatgg gcggaactat gacatctatt 480
 tttgctgcat taaatgaaga cttgccgatt aaaaacttaa tttttatgac aagtccattt 540
 gatttttcgg atacagggtt atacggagca ttcctagatg atcgctactt taatttagat 600
 aaagcagtag atacattcgg aaacatccct ccagagatga ttgactttgg aaacaagatg 660
 ttaaagccaa tcacgaattt ctacggcccg tatgtaacgt tggtaggaccg ttcgggaaat 720
 cagcgggttg ttgaaagctg gaagctaatt caaaagtggg ttgctgacgg aatcccattt 780
 gctggcggaag cttatcgtca gtggattcgt gacttctatc aacaaaacaa actaatcaat 840
 ggtgaacttg aagttcgcgg acgcaaagta gatttaaaaa atattaaagc taatatttta 900

aacattgctg ctagccgtga tcatattgcg atgccgcac c aagtggcagc tttaatggac 960
gctgtttcaa gtgaagataa agagtataaa ttgttgcaaa caggtcacgt atctgttgta 1020
tttgggtccaa aagcagtga ggaacatat ccttcaatcg gcgattggct agaaaaacgc 1080
tctaaa 1086

<210> 11
<211> 362
<212> PRT
<213> Bacillus megaterium

<400> 11
Met Ala Ile Pro Tyr Val Gln Glu Trp Glu Lys Leu Ile Lys Ser Met
1 5 10 15
Pro Ser Glu Tyr Lys Ser Ser Ala Arg Arg Phe Lys Arg Ala Tyr Glu
20 25 30
Ile Met Thr Thr Glu Ala Glu Pro Glu Val Gly Leu Thr Pro Lys Glu
35 40 45
Val Ile Trp Lys Lys Asn Lys Ala Lys Leu Tyr Arg Tyr Thr Pro Val
50 55 60
Lys Asp Asn Leu His Lys Thr Pro Ile Leu Leu Val Tyr Ala Leu Ile
65 70 75 80
Asn Lys Pro Tyr Ile Leu Asp Leu Thr Pro Gly Asn Ser Leu Val Glu
85 90 95
Tyr Leu Leu Asn Arg Gly Phe Asp Val Tyr Leu Leu Asp Trp Gly Thr
100 105 110
Pro Gly Leu Glu Asp Ser Asn Met Lys Leu Asp Asp Tyr Ile Val Asp
115 120 125
Tyr Ile Pro Lys Ala Ala Lys Lys Val Leu Arg Thr Ser Lys Ser Pro
130 135 140
Asp Leu Ser Val Leu Gly Tyr Cys Met Gly Gly Thr Met Thr Ser Ile
145 150 155 160
Phe Ala Ala Leu Asn Glu Asp Leu Pro Ile Lys Asn Leu Ile Phe Met
165 170 175
Thr Ser Pro Phe Asp Phe Ser Asp Thr Gly Leu Tyr Gly Ala Phe Leu
180 185 190
Asp Asp Arg Tyr Phe Asn Leu Asp Lys Ala Val Asp Thr Phe Gly Asn
195 200 205
Ile Pro Pro Glu Met Ile Asp Phe Gly Asn Lys Met Leu Lys Pro Ile
210 215 220

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Thr Asn Phe Tyr Gly Pro Tyr Val Thr Leu Val Asp Arg Ser Glu Asn
225 230 235 240

Gln Arg Phe Val Glu Ser Trp Lys Leu Met Gln Lys Trp Val Ala Asp
245 250 255

Gly Ile Pro Phe Ala Gly Glu Ala Tyr Arg Gln Trp Ile Arg Asp Phe
260 265 270

Tyr Gln Gln Asn Lys Leu Ile Asn Gly Glu Leu Glu Val Arg Gly Arg
275 280 285

Lys Val Asp Leu Lys Asn Ile Lys Ala Asn Ile Leu Asn Ile Ala Ala
290 295 300

Ser Arg Asp His Ile Ala Met Pro His Gln Val Ala Ala Leu Met Asp
305 310 315 320

Ala Val Ser Ser Glu Asp Lys Glu Tyr Lys Leu Leu Gln Thr Gly His
325 330 335

Val Ser Val Val Phe Gly Pro Lys Ala Val Lys Glu Thr Tyr Pro Ser
340 345 350

Ile Gly Asp Trp Leu Glu Lys Arg Ser Lys
355 360

<210> 12

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 12

aayacrgtna aataynnnac rgtnatynnn gcdatgatg

39

<210> 13

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 13

gcdatyccdt aygtncarga agghttyaaa

30

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<210> 14
<211> 19
<212> DNA
<213> SYNTHETIC

<400> 14
gcttcatgcg tgcggtttg 19

<210> 15
<211> 22
<212> DNA
<213> SYNTHETIC

<400> 15
ggaccgttcg gaaaatcagc gg 22

<210> 16
<211> 20
<212> DNA
<213> SYNTHETIC

<400> 16
cccctttgtc cattgttccc 20

<210> 17
<211> 19
<212> DNA
<213> SYNTHETIC

<400> 17
ccatgtagat tccaccctc 19

<210> 18
<211> 19
<212> DNA
<213> SYNTHETIC

<400> 18
ctccatctcc tttcttgtg 19

<210> 19
<211> 17
<212> PRT
<213> Bacillus megaterium

<400> 19
Lys Val Phe Gly Arg Xaa Glu Leu Ala Ala Ala Met Lys Arg Xaa Gly
1 5 10 15

Leu

<210> 20
<211> 15
<212> PRT
<213> Bacillus megaterium

<400> 20
Asn Thr Val Lys Tyr Xaa Thr Val Ile Xaa Ala Met Xaa Xaa Gln
1 5 10 15

<210> 21
<211> 11
<212> PRT
<213> Bacillus megaterium

<400> 21
Ala Ile Pro Tyr Val Gln Glu Xaa Glu Lys Leu
1 5 10

<210> 22
<211> 813
<212> DNA
<213> Bacillus megaterium

<400> 22
atggatgcat cacttttgtt agagtatgga tgggtattgc tagtgctggt tgcattagaa 60
ggaatttttg cggcggataa tgctcttggt atggctatta tggcacaaca tttaccggaa 120
gaaaaacgca agaaggcatt attttacgga ttagccggtg cctttatttt tagatttggt 180
tcgttggttct tgatttcatt tttagtcgac gtatggcagc ttcaagctat aggagccatt 240
tacttattgt tcatttccat taatcatatt gtgaagcgat atgtgaaaaa agacgatcat 300
gaaaaagtga aagaagcaga cgagaaaaag ggctcagggt tctggatgac gggttttaaaa 360
gtagaaatag cagacattgc ttttgccggt gattcaattt tggccgctgt ggctctcgcc 420
gttacgttgc caacaacaaa tcttcctcaa attggcggac tcgacggcgg acaattcttg 480
gtgatcttcg ccggaggaat tatgggatta attattatgc gttttgctgc aacttggttc 540
gtcaagctat taaatacgcg cccaggccta gaaacggcgg cttttgctat tgtaggctgg 600
gtaggagtta agtttagcgt ctataccctt gctcatccag agttagggtat tattaatgaa 660
catttcctcg aatcaaaagt gtggaaaatt acgttttgga ttgtgttact tggcatagct 720
gcttcaggct gggtttctatc taaaaataaa gaacaaactg atcttgaagg ctcagagaaa 780
gaaaaagaat cggttaaaaaa aattgaaaat caa 813

<210> 23
<211> 271
<212> PRT
<213> Bacillus megaterium

<400> 23

Met Asp Ala Ser Leu Leu Leu Glu Tyr Gly Trp Val Leu Leu Val Leu
 1 5 10 15
 Val Ala Leu Glu Gly Ile Leu Ala Ala Asp Asn Ala Leu Val Met Ala
 20 25 30
 Ile Met Val Lys His Leu Pro Glu Glu Lys Arg Lys Lys Ala Leu Phe
 35 40 45
 Tyr Gly Leu Ala Gly Ala Phe Ile Phe Arg Phe Gly Ser Leu Phe Leu
 50 55 60
 Ile Ser Phe Leu Val Asp Val Trp Gln Leu Gln Ala Ile Gly Ala Ile
 65 70 75 80
 Tyr Leu Leu Phe Ile Ser Ile Asn His Ile Val Lys Arg Tyr Val Lys
 85 90 95
 Lys Asp Asp His Glu Lys Val Lys Glu Ala Asp Glu Lys Lys Gly Ser
 100 105 110
 Gly Phe Trp Met Thr Val Leu Lys Val Glu Ile Ala Asp Ile Ala Phe
 115 120 125
 Ala Val Asp Ser Ile Leu Ala Ala Val Ala Leu Ala Val Thr Leu Pro
 130 135 140
 Thr Thr Asn Leu Pro Gln Ile Gly Gly Leu Asp Gly Gly Gln Phe Leu
 145 150 155 160
 Val Ile Phe Ala Gly Gly Ile Met Gly Leu Ile Ile Met Arg Phe Ala
 165 170 175
 Ala Thr Trp Phe Val Lys Leu Leu Asn Thr Arg Pro Gly Leu Glu Thr
 180 185 190
 Ala Ala Phe Ala Ile Val Gly Trp Val Gly Val Lys Leu Ala Val Tyr
 195 200 205
 Thr Leu Ala His Pro Glu Leu Gly Ile Ile Asn Glu His Phe Pro Glu
 210 215 220
 Ser Lys Val Trp Lys Ile Thr Phe Trp Ile Val Leu Leu Gly Ile Ala
 225 230 235 240
 Ala Ser Gly Trp Phe Leu Ser Lys Asn Lys Glu Gln Thr Asp Leu Glu
 245 250 255
 Gly Ser Glu Lys Glu Lys Glu Ser Leu Lys Lys Ile Glu Asn Gln
 260 265 270

<210> 24

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<211> 708
 <212> DNA
 <213> Bacillus megaterium

<400> 24
 atgctcaciaa aagttcaaac gcctccatcg cttgaaacgc ttgtactgac gattcagcaa 60
 ggggataaac aattacataa tgaaatgatt caacaatata aaccgtttat tgctaaagtt 120
 gtttcagctg tatgtaaacg ttatataagt gaagctgacg atgaatttag cattgggtctg 180
 attgcattta atgaagccat tgaaaattac acaatccaaa aaggacgacg tcttcttgca 240
 tttgcggaac ttattattaa aagaagagta atcgactata ttcgaaaaga aaagcgaaat 300
 caaacgctgc tctataaccg aattgaaaat gaaggtttta ttcaaggtaa ggtagaaagg 360
 gatataatcgc tttctaacta taaaaggcaa agtgaaactt catatatattca agaggaaatg 420
 acttattttt gtcaggcgct aaaattgttt aaattaactc ttgaagacat tattaacacg 480
 tctcctaaac ataaggatgc aaggggaaat gcagtggaag ttgcatcttt tatcgatcaat 540
 gaaaaagaat taaaagataa gctgttttta aagcggcagc ttcctattcg cttgattgaa 600
 aaacatgtca aagtaagccg gaaaacaatt gaaagaaacc gtaaataatat tatcgcgatg 660
 gttattatat tagcggggga ctacgtgtat ttaaaagact atattatg 708

<210> 25
 <211> 236
 <212> PRT
 <213> Bacillus megaterium

<400> 25
 Met Leu Thr Lys Val Gln Thr Pro Pro Ser Leu Glu Thr Leu Val Leu
 1 5 10 15
 Thr Ile Gln Gln Gly Asp Lys Gln Leu His Asn Glu Met Ile Gln Gln
 20 25 30
 Tyr Lys Pro Phe Ile Ala Lys Val Val Ser Ala Val Cys Lys Arg Tyr
 35 40 45
 Ile Ser Glu Ala Asp Asp Glu Phe Ser Ile Gly Leu Ile Ala Phe Asn
 50 55 60
 Glu Ala Ile Glu Asn Tyr Thr Ile Gln Lys Gly Arg Ser Leu Leu Ala
 65 70 75 80
 Phe Ala Glu Leu Ile Ile Lys Arg Arg Val Ile Asp Tyr Ile Arg Lys
 85 90 95
 Glu Lys Arg Asn Gln Thr Leu Leu Tyr Asn Arg Ile Glu Asn Glu Gly
 100 105 110
 Phe Ile Gln Gly Lys Val Glu Arg Asp Ile Ser Leu Ser Asn Tyr Lys
 115 120 125
 Arg Gln Ser Glu Thr Ser Tyr Ile Gln Glu Glu Met Thr Tyr Phe Cys
 130 135 140
 Gln Ala Leu Lys Leu Phe Lys Leu Thr Leu Glu Asp Ile Ile Asn Thr

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Leu Ser Ile Pro Glu Ala Leu Arg Pro Gly Ala Lys Leu Ala Phe Ile
35 40 45

Asp Arg Leu Phe Ile Ala Val Ser Ala Val Ser Val Thr Gly Leu Thr
50 55 60

Pro Val Ser Thr Pro Asp Thr Phe Ser Thr Thr Gly Tyr Phe Leu Leu
65 70 75 80

Val Phe Ile Phe Gln Ile Gly Gly Ile Gly Val Met Thr Leu Ser Thr
85 90 95

Phe Ile Trp Met Ile Leu Gly Lys Lys Ile Gly Leu Lys Glu Arg Gln
100 105 110

Leu Ile Met Thr Asp His Asn Gln Ser Arg Leu Ser Gly Leu Val Asp
115 120 125

Leu Met Arg Asn Ile Leu Phe Ile Ile Phe Ala Ile Glu Leu Val Gly
130 135 140

Ala Ile Ile Leu Gly Leu His Phe Leu Arg Tyr Tyr Ser Ser Trp Thr
145 150 155 160

Asp Ala Phe Leu His Gly Phe Phe Ala Ser Val Ser Ala Thr Thr Asn
165 170 175

Ala Gly Phe Asp Ile Thr Gly Ser Ser Phe Ile Pro Tyr Ala His Asp
180 185 190

Tyr Phe Val Gln Val Val Thr Val Ile Leu Ile Thr Leu Gly Ala Ile
195 200 205

Gly Phe Pro Val Leu Ile Glu Ile Lys His Tyr Phe Leu Thr Phe Lys
210 215 220

Asp Lys Arg Lys Phe Gln Phe Ser Leu Phe Thr Lys Leu Thr Thr Ile
225 230 235 240

Met Phe Phe Leu Leu Leu Gly Gly Gly Thr Ile Leu Ile Leu Val Leu
245 250 255

Glu His Ser Gly Phe Leu Ala Asp Lys Ser Trp Asp Glu Ser Phe Phe
260 265 270

Tyr Ala Phe Phe Gln Ser Ala Ala Thr Arg Ser Gly Gly Val Ala Thr
275 280 285

Met Asn Ile Asn Glu Phe Ser Leu Pro Thr Leu Ile Met Met Ser Ala
290 295 300

Met Met Phe Ile Gly Ala Ser Pro Ser Ser Val Gly Gly Gly Ile

305

310

315

<210> 28
<211> 195
<212> DNA
<213> Bacillus megaterium

<400> 28
atggctagaa caaataaact attaacacca ggagtagaac aatttttaga tcaatataaa 60
tatgaaatcg ctcaagaatt tggggtaact ctaggttctg acactgctgc acgcagcaac 120
ggttcagtag gcggagaaat cacaaaacgc ttggtgcaac aagctcaagc tcacttaagc 180
ggcagcacac aaaaa 195

<210> 29
<211> 65
<212> PRT
<213> Bacillus megaterium

<400> 29
Met Ala Arg Thr Asn Lys Leu Leu Thr Pro Gly Val Glu Gln Phe Leu
1 5 10 15
Asp Gln Tyr Lys Tyr Glu Ile Ala Gln Glu Phe Gly Val Thr Leu Gly
20 25 30
Ser Asp Thr Ala Ala Arg Ser Asn Gly Ser Val Gly Gly Glu Ile Thr
35 40 45
Lys Arg Leu Val Gln Gln Ala Gln Ala His Leu Ser Gly Ser Thr Gln
50 55 60
Lys
65

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